

Armed Forces College of Medicine

AFCM



Lower 4 cranial nerves

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Professor of Anatomy

INTENDED LEARNING OBJECTIVES (ILO)



By the end of this lecture the student will be able to:

1. **Describe course and branches of glossopharyngeal nerve & vagus nerve, in neck.**
2. **Describe course and branches of accessory nerve: its cranial & spinal parts.**
3. **Describe course and branches of**

Lecture Plan



1. Part 1 (5 min) Introduction to any cranial nerve
2. Part 2 (25 min) Glossopharyngeal & Vagus nerves
3. Part 3 (10 min) Accessory nerve
4. Part 4 (10 min) Hypoglossal nerve
5. Summary (5 min)

Points to be discussed in any cranial nerve



1- Deep attachment (nuclei).

2- Superficial attachment (medulla oblongata).

3- Site of piercing the dura.

4- Exit from skull.

5- Course & pathway.

6- Branches.

7- Applied points.

Glossopharyngeal Nerve

Glosso-pharyngeal N. (IX)

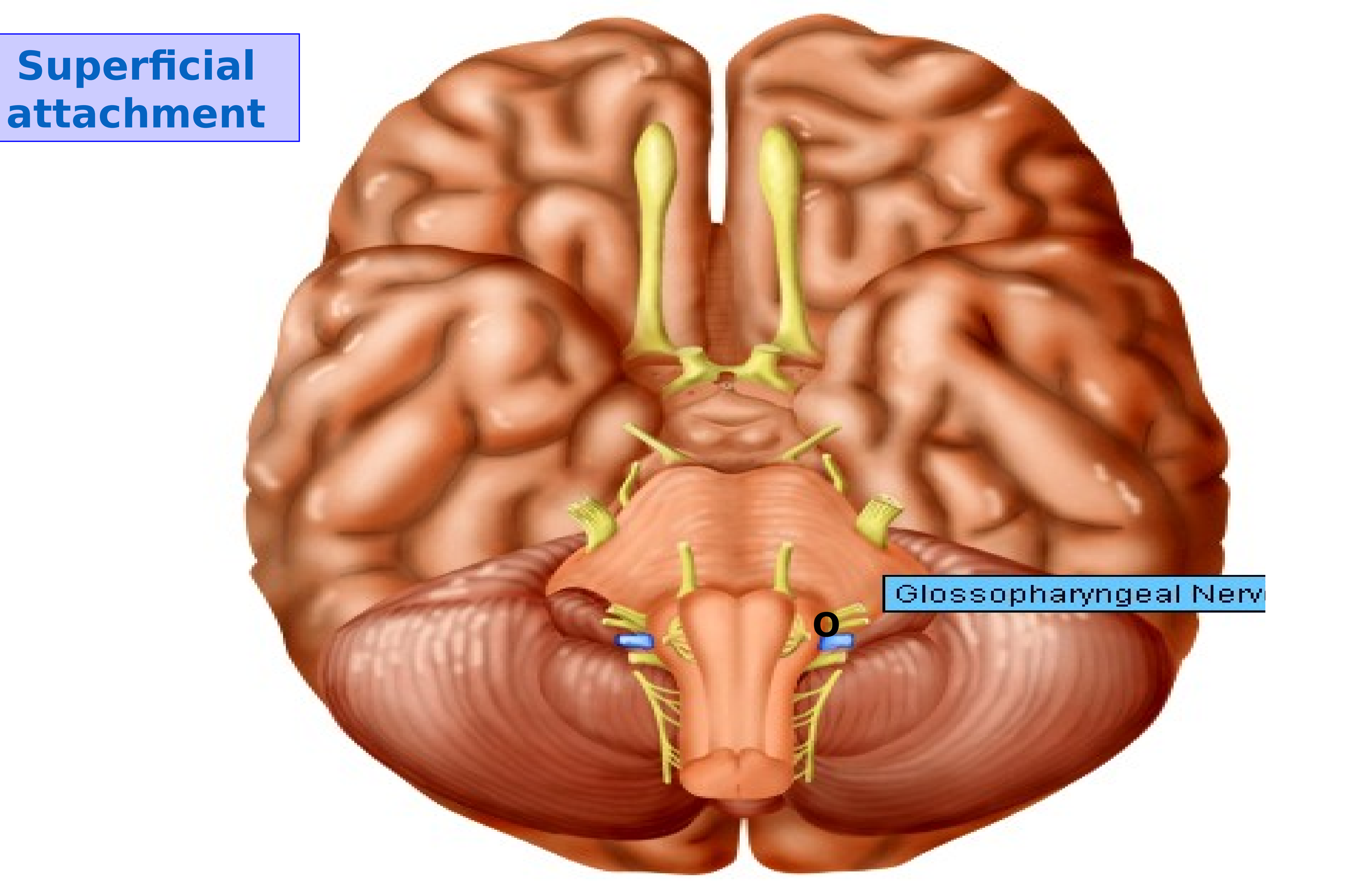
It supplies

Tongue

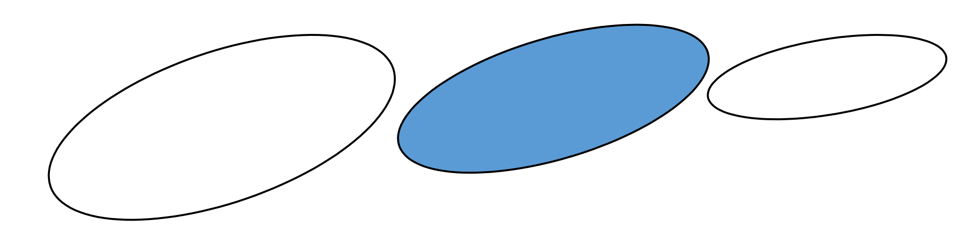
&

Pharynx

Superficial attachment



<u>Exit from the skull:</u> via middle compartment of Jugular F.



J.F.

A

• Course of Glossopharyngeal N.

N. which passes in between:

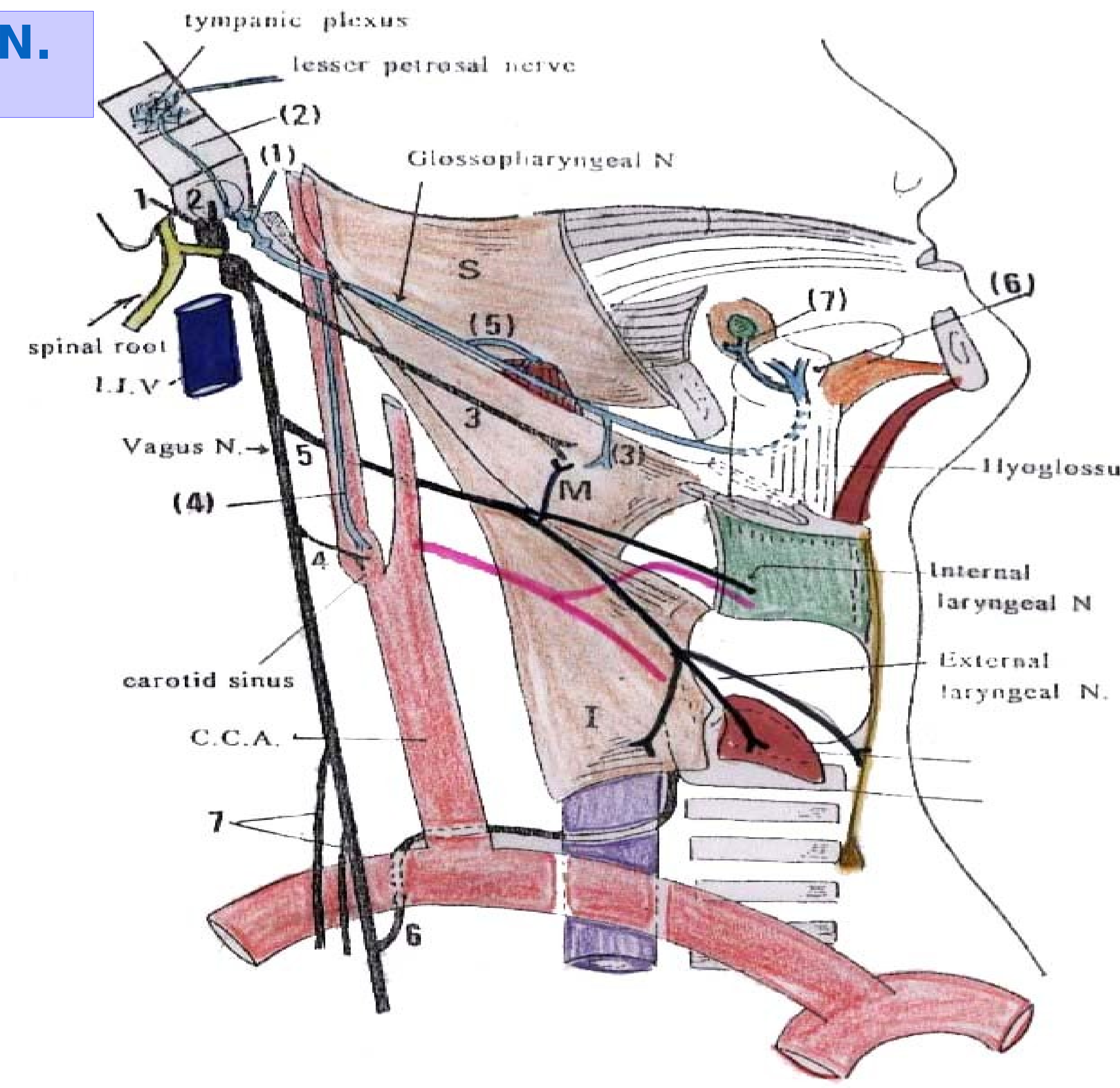
1- **Olive & ICP** of medulla oblongata.

2- Middle compartment of jugular F. i.e. **between med. & lat. compartments of the jugular F.**

3- **ICA & IJV** in the carotid sheath.

4- **ICA & ECA** leaving the carotid sheath.

5- **Sup. & middle**



• Branches of Glossopharyngeal N.

1- **Tympanic br.** (*middle* ear br.) → tympanic plx → lesser petrosal N. (sensory & parasymp.) → relays in otic ganglion → auriculotemporal N. to parotid gld.

2- **Carotid br.** → carotid body.

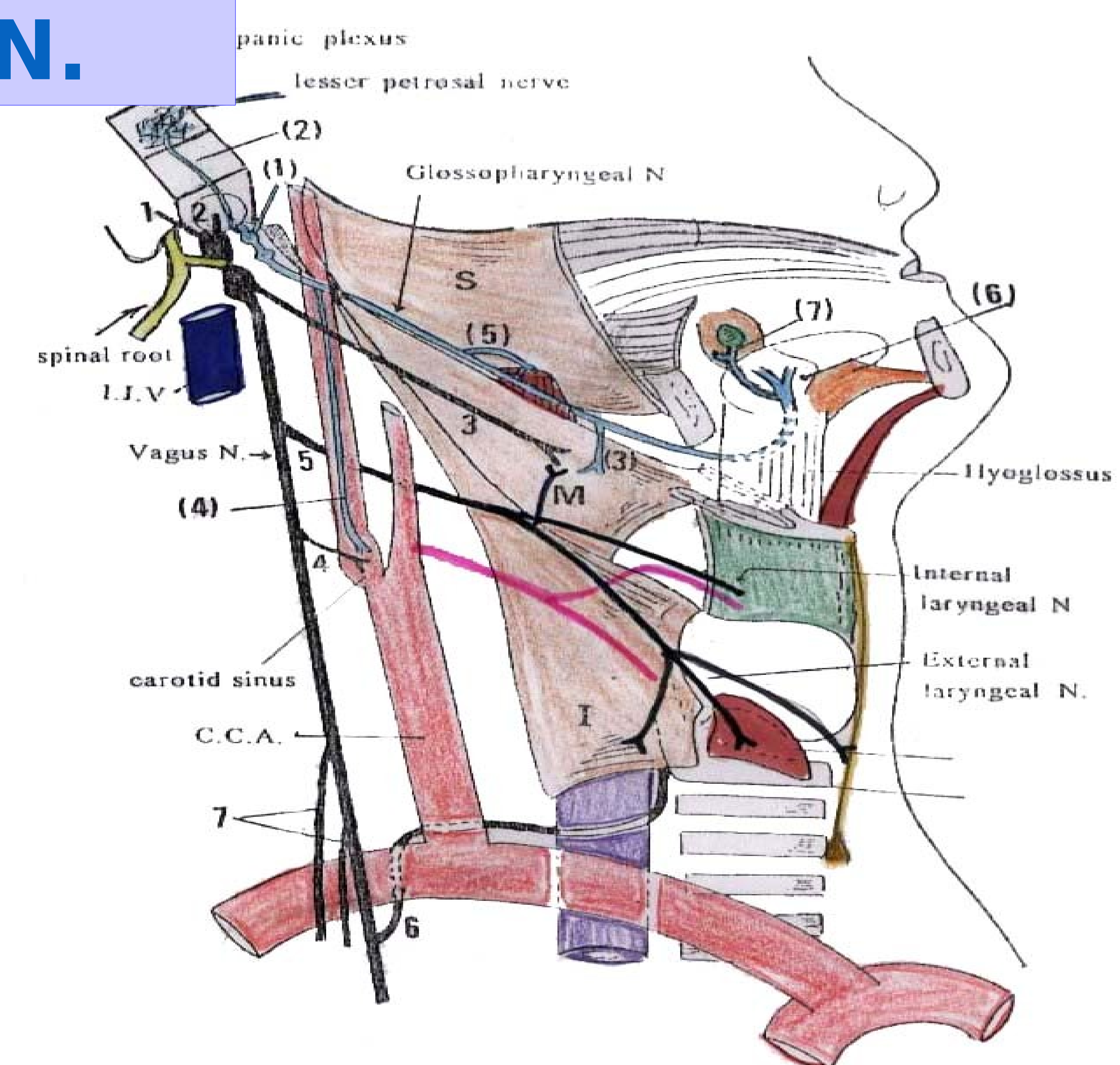
3- **Pharyngeal br.** (**Sensory**) → pharyngeal plexus.

4- **Tonsillar br**. → palatine tonsil.

5- **Lingual br.** → post. 1/3 of tongue (taste & general sensations).

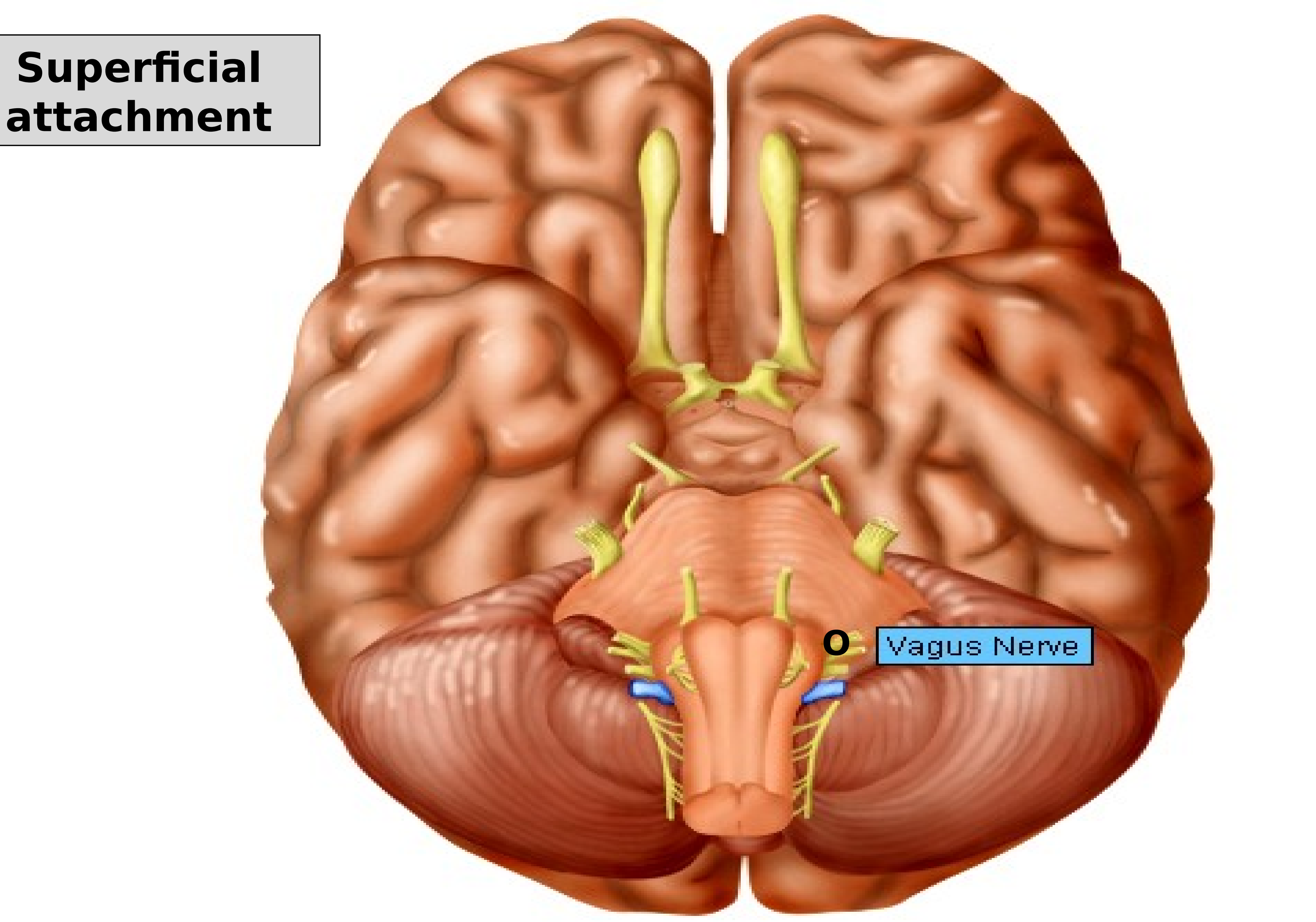
6- **Meningeal** → sensory to post. cranial fossa meninges.

(**& Motor** → stylopharyngeus M.)

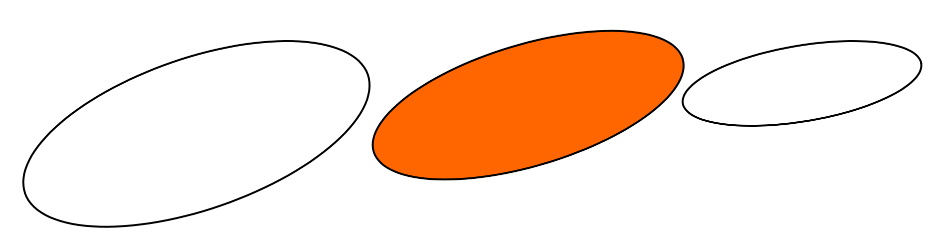


Vagus Nerve

Superficial attachment



<u>Exit from the skull:</u> via middle compartment of Jugular F.



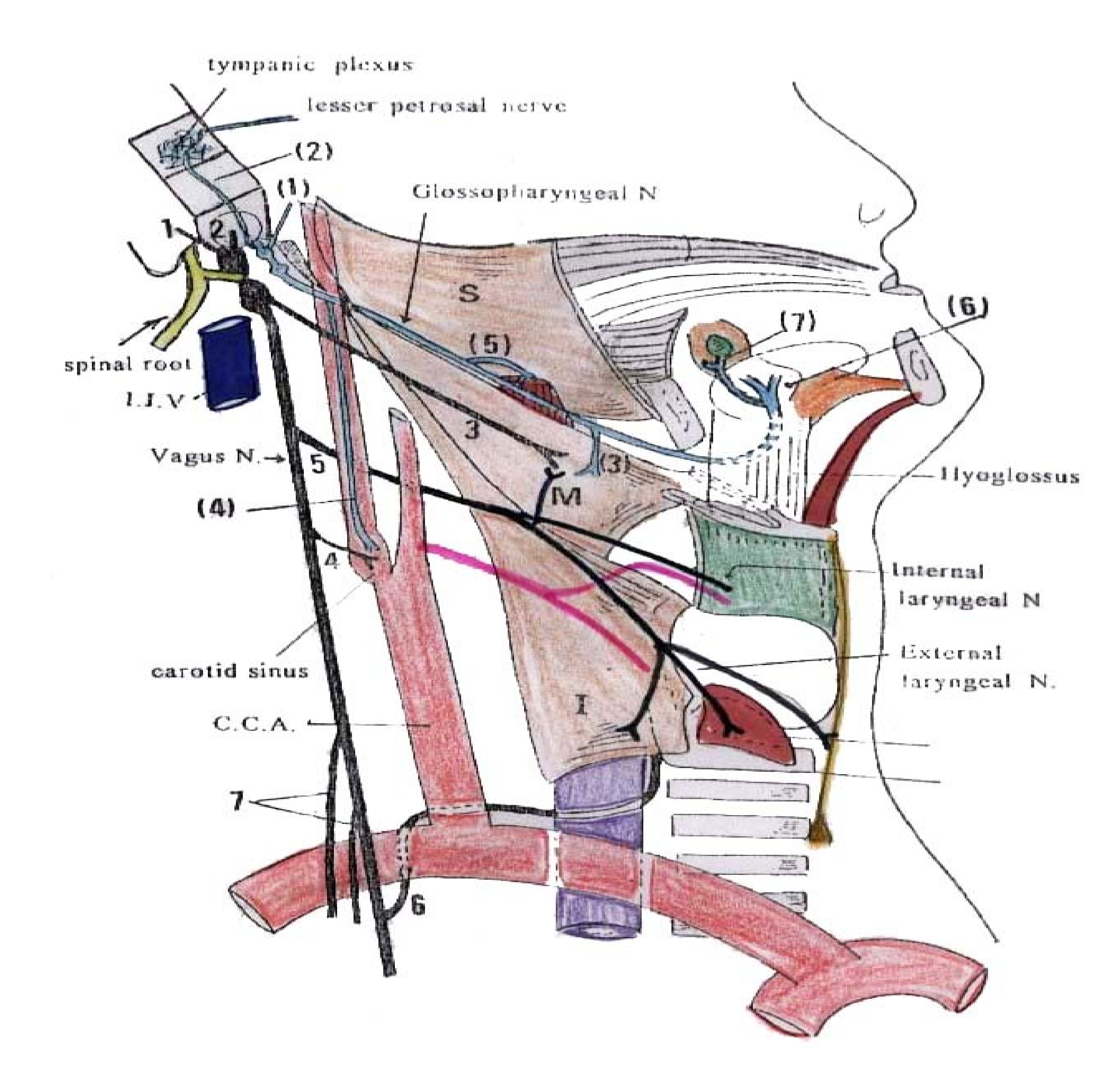
Vagus N.
(Course)

1- **Olive & ICP** of medulla oblongata.

2- Middle compartment of jugular F. i.e. **between med. & lat. compartments of the jugular F.**

3- **ICA & IJV** in the carotid sheath.

4- Continues inside the sheath between CCA & IJV.



Brs. of Vagus N.

1- Auricular br. (***external*** ear br.).

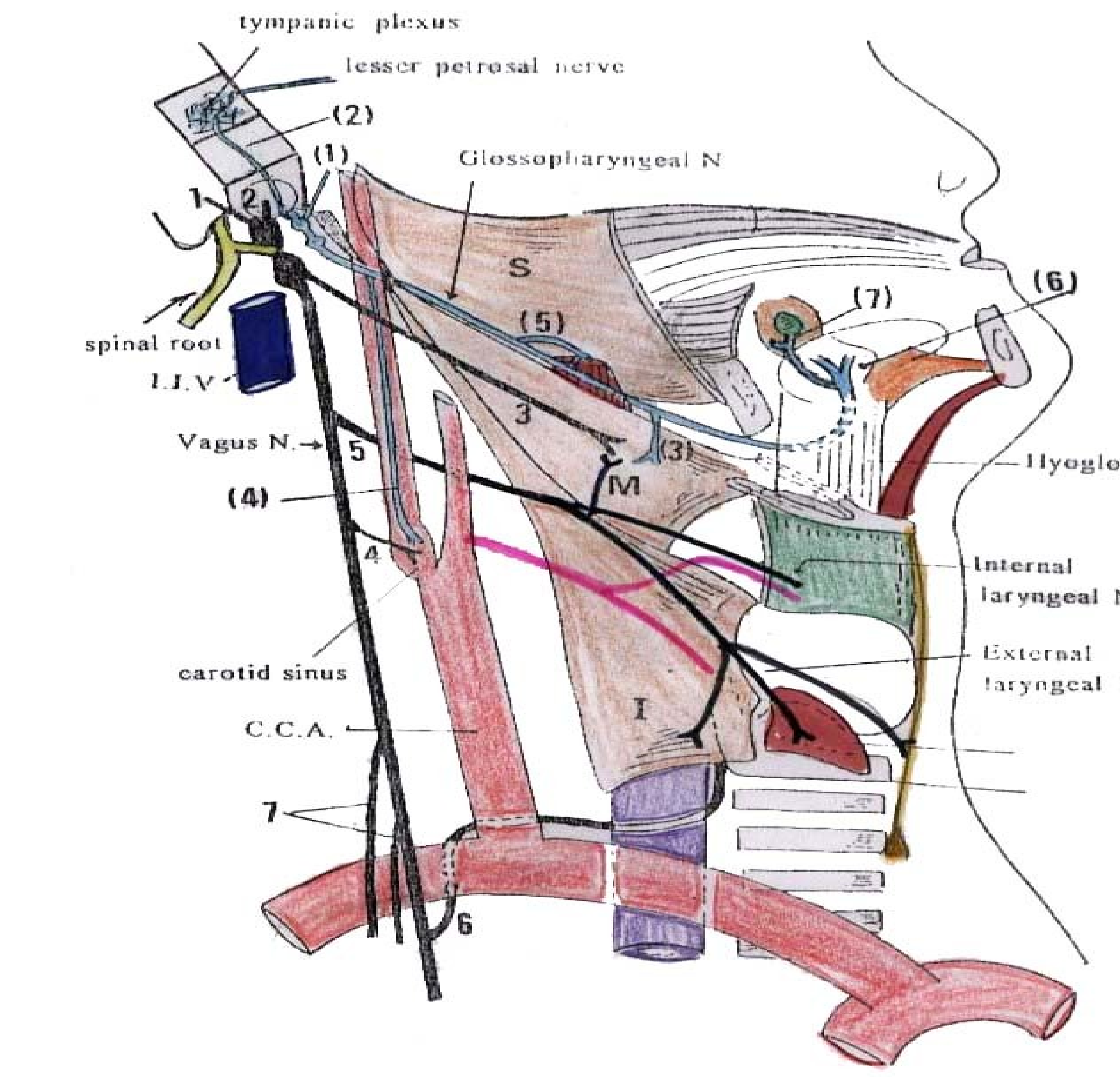
2- **C**arotid br. → carotid body.

3- **P**haryngeal br. (**Motor**) → pharyngeal plexus.

4- Sup. **laryngeal** br.

5- Recurrent **laryngeal** br.

6- **M**eningeal → sensory



Brs. of Glossopharyngeal N.

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2- **C**arotid br. → carotid body.

3- **P**haryngeal br. (**Motor**) → pharyngeal plexus.

4- Sup. **laryngeal** br.

5- Recurrent **laryngeal** br.

6- **M**eningeal → sensory to post. cranial fossa

Lecture Quiz



The glossopharyngeal nerve is accidentally transected in a surgical procedure done in a 45-years-old male patient. Which of the following is most likely to be lost in this patient?

A. **Taste sensation from the anterior 2/3 of the tongue.**
B. **General sensation from the tonsil.**
C. **Salivary secretion from submandibular gland.**
D. **Protrusion of the tongue**

Lecture Quiz Answer



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Accessory Nerve

Accessory N.

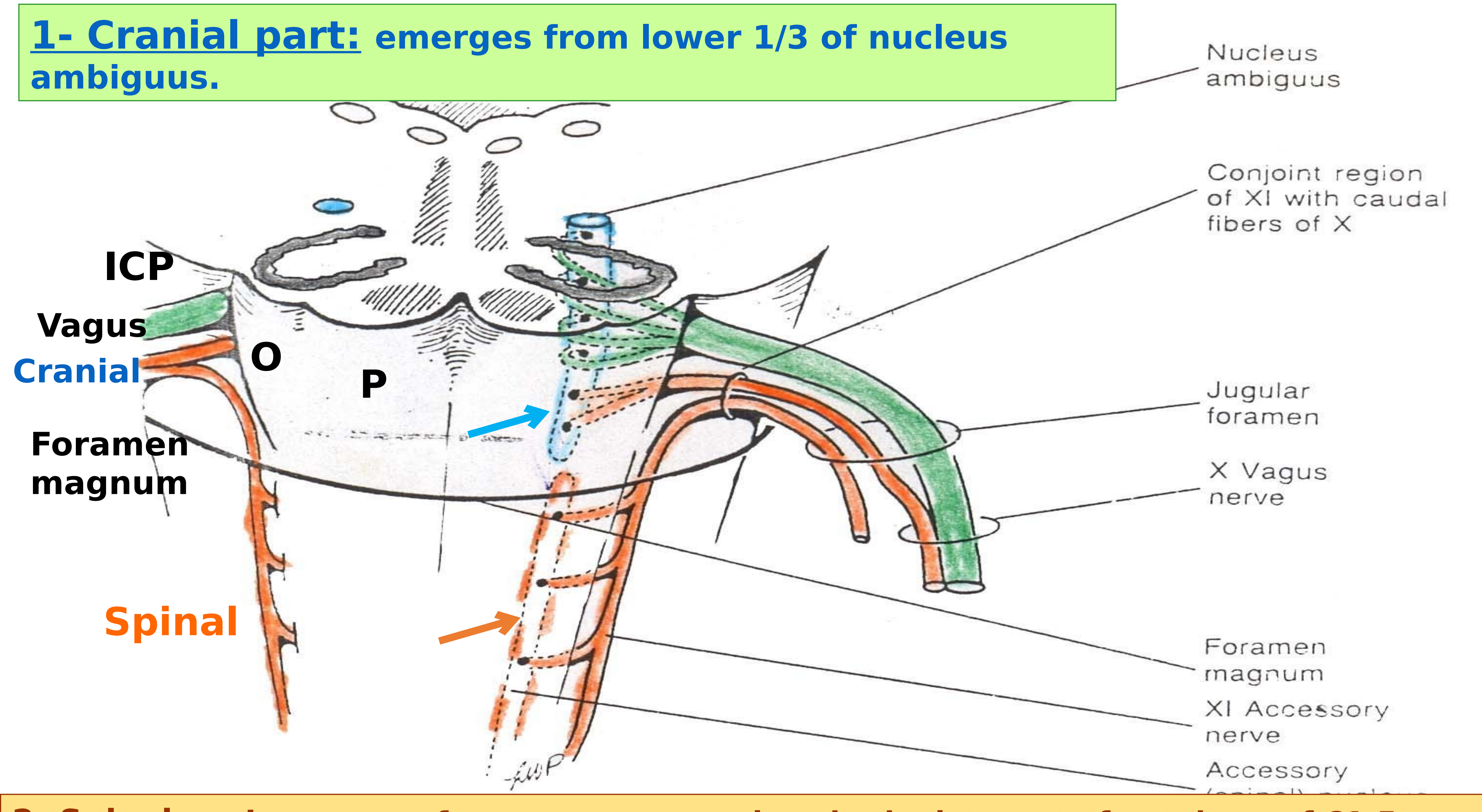
It is purely motor

It has 2 parts:

1- Cranial part

2- Spinal part

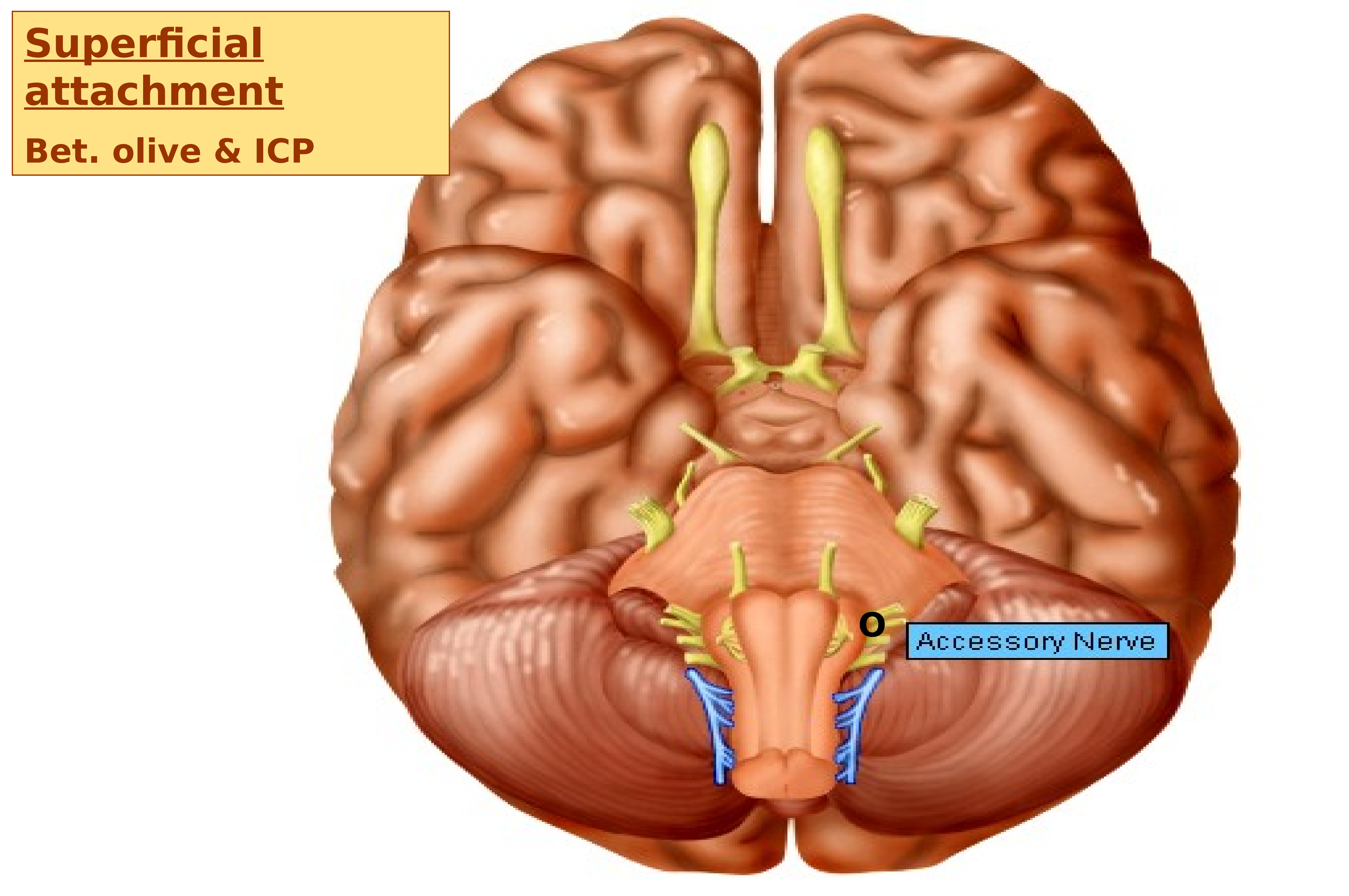
1- Cranial part: emerges from lower 1/3 of nucleus ambiguus.



2- Spinal part: emerges from accessory nucleus in the lat. part of ant. horn of C1-5 → enters skull via F. magnum

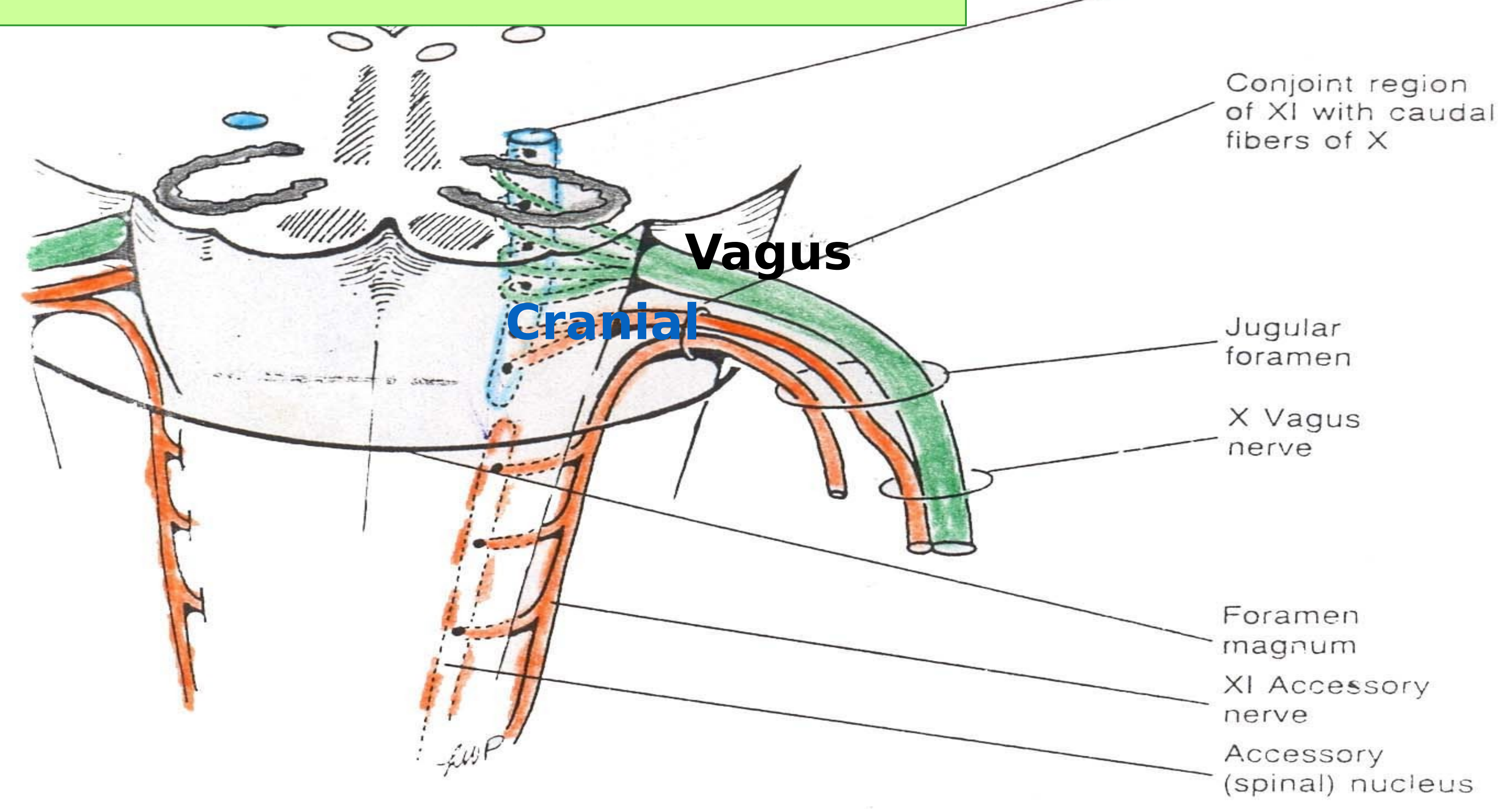
Superficial attachment

Bet. olive & ICP



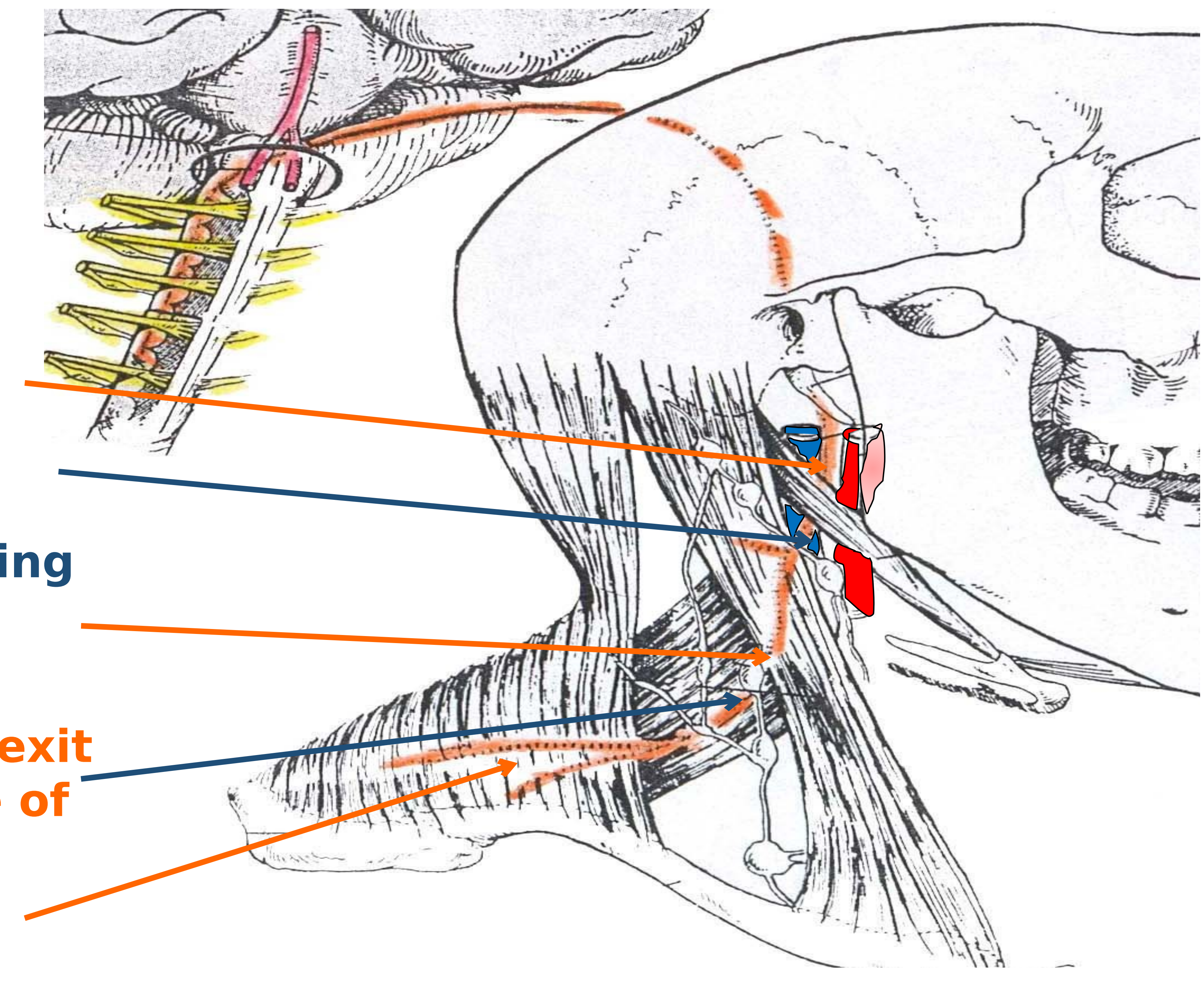
1- Cranial part: **emerges from lower 1/3 of nucleus ambiguus.**

The cranial part joins the vagus to be distributed through its branches (pharyngeal and recurrent laryngeal) to supply the muscles of the palate (except the tensor palati); pharynx and larynx.



2-Spinal part

Spinal part



1- In carotid sheath.

2- Leaves the sheath by crossing IJV posteriorly.

3- Supplies sternomastoid, exit from the middle of its post. border.

4- On levator scapulae in the

Applied anatomy

- **Torticollis** = spasm of trape
sternomastoid Ms. due to **acc**
irritation e.g. by enlarged LN
triangle.



A tale of 2 friends

Lecture Quiz



Spinal part of accessory nerve supplies:

A. Trapezius and sternohyoid.
B. Sternomastoid and sternothyroid.
C. Trapezius and sternothyroid.
D. Sternomastoid and sternohyoid.
E. Trapezius & sternomastoid.

Lecture Quiz Answer



Spinal part of accessory nerve supplies:

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B. Sternomastoid and sternothyroid.
C. Trapezius and sternothyroid.
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Hypoglossal Nerve

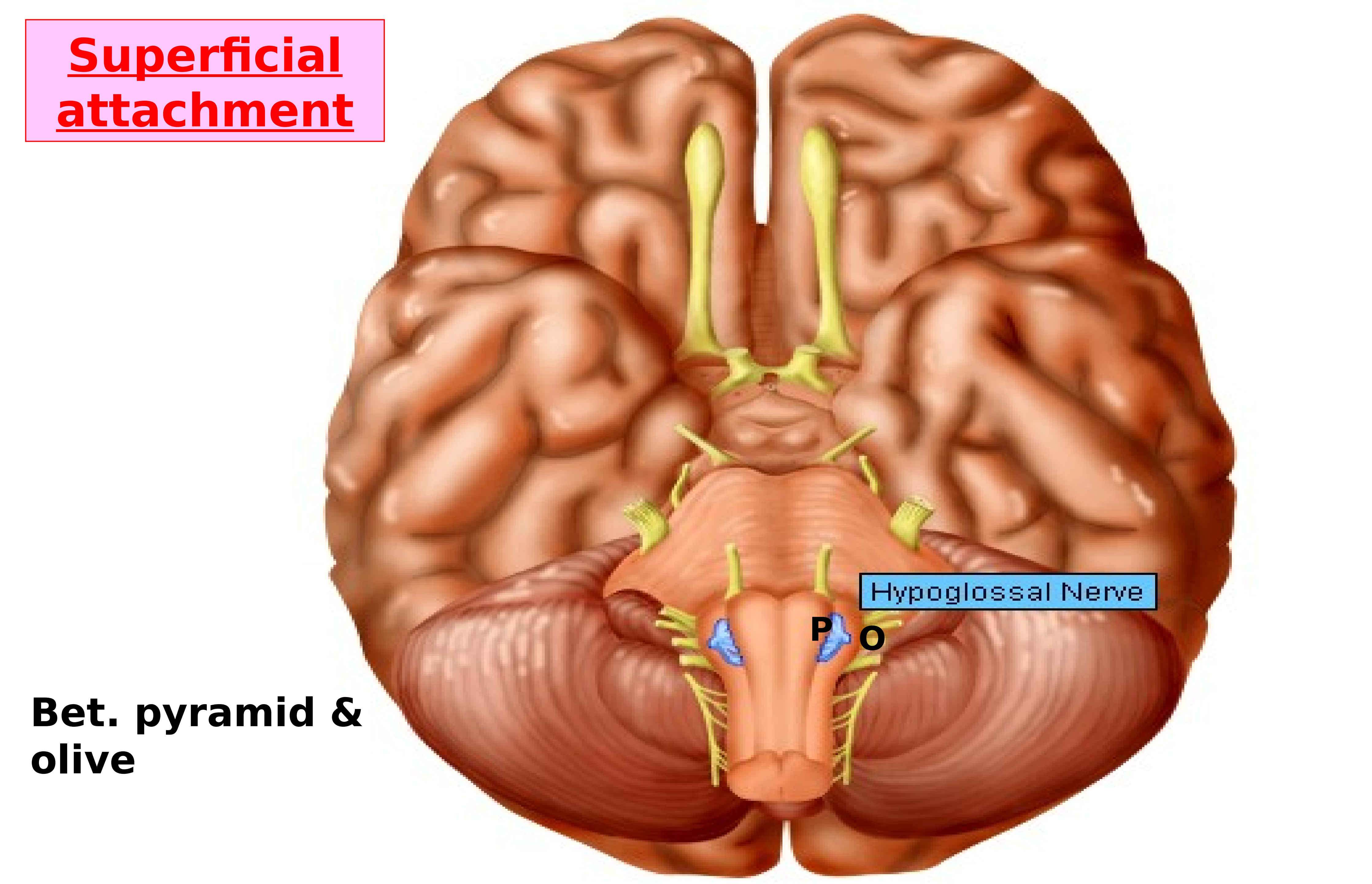
Hypoglossal N. (XII)

It is ***PURELY MOTOR N.***

to Ms. of the tongue,

reaching the tongue from below- upwards.

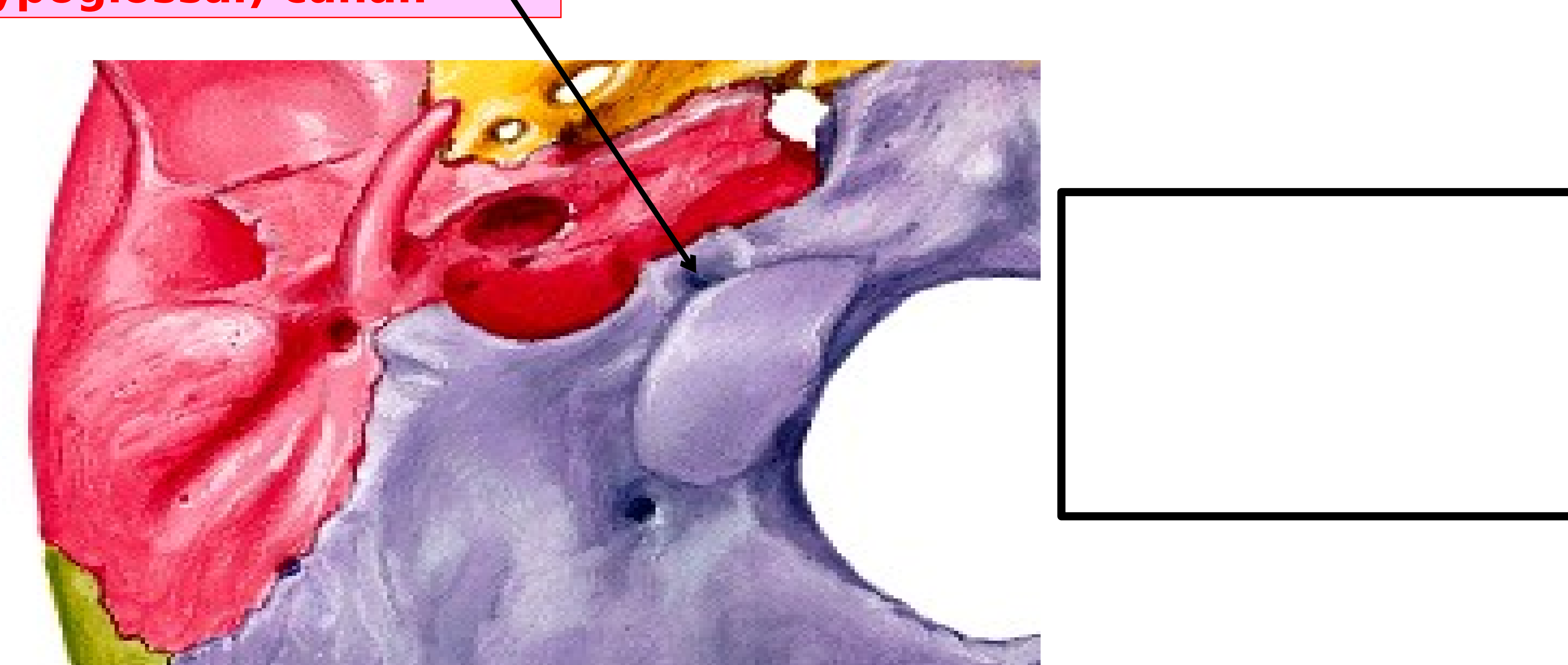
Superficial attachment



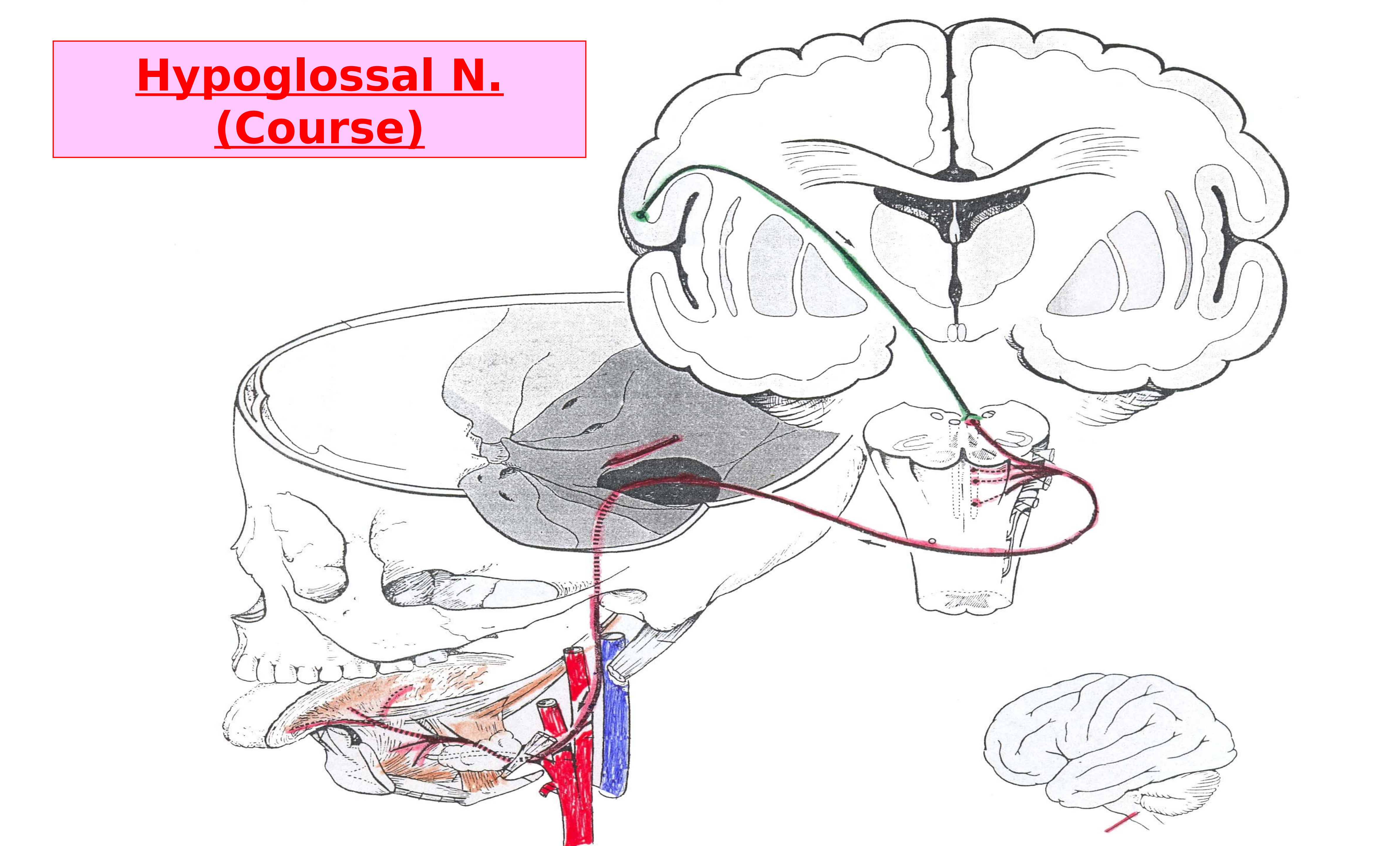
Bet. pyramid & olive

Exit from skull:

via ant. condylar (Hypoglossal) canal.

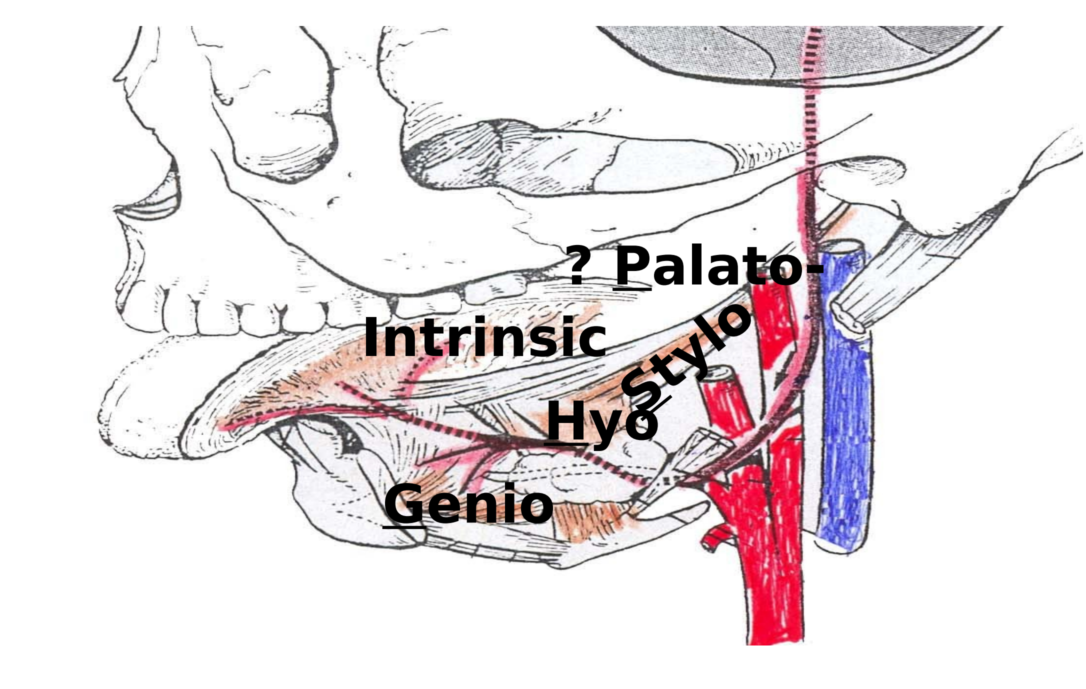


Hypoglossal N. (Course)



Hypoglossal N. (Course & Branches)

- Descends **vertically** between I.J.V. and I.C.A.
- Entering the carotid triangle, it runs **forwards** with a curve crossing I.C.A. ,ECA and the bend of lingual artery.
- it runs **upwards** and **forwards** in digastric triangle superficial to hyoglossus
- Disappears under cover of mylohyoid, and to **enter** genioglossus muscle.



Branches:

A. Branches originally from C1

1. Meningeal: re-enters skull through anterior condylar canal.
2. Descendens hypoglossi: joins descendens cervicalis to form ansa cervicalis which supplies infrahyoid muscles.
3. Nerve to thyrohyoid.
4. Nerve to geniohyoid.

B. Branches for tongue musculatures

1. To hyoglossus. 2. To styloglossus.

Clinical testing

- **Ask the patient to protrude the tongue outwards:**

1) **Normally**, it is out & straight as actions of both genioglossus Ms. are neutralized.
2) **In LMNL of XII**, it is deviated to the same side (associated with wasting of tongue) by the effect of the unopposed contralat. genioglossus M.
3) **In UMNL of XII**, it is deviated to the contralat. side (associated with no wasting of tongue).
4) **In bilat. XII lesion**, the tongue lies motionless with slow articulation & difficult swallowing.

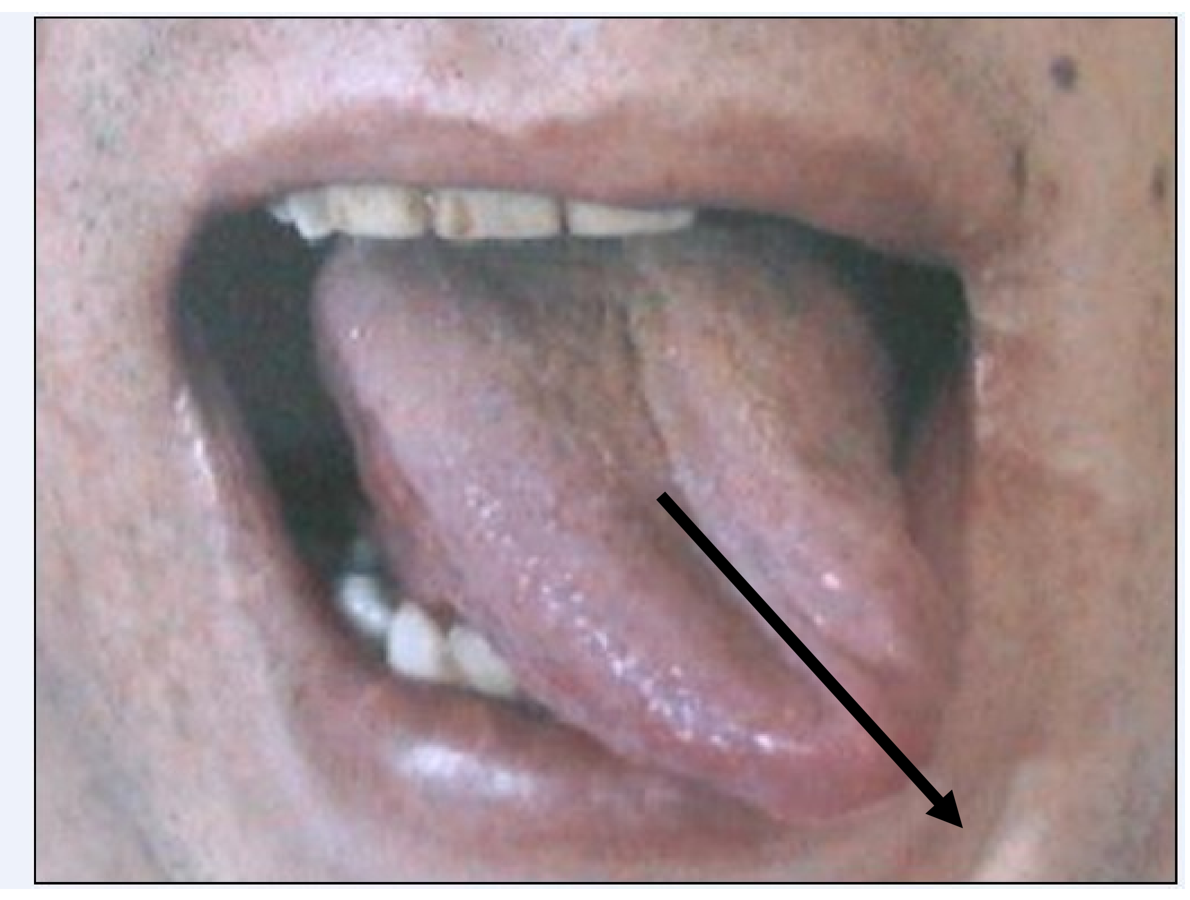
LMNL

UMNL

To same side

To opposite side





LMNL

UMNL

Lecture Quiz



A patient is asked to stick out her tongue and a left deviation is noted. This problem most likely indicates injury to which of the following cranial nerves?

A. Mandibular division of the left trigeminal.

B. Left facial.

C. Left glossopharyngeal.

D. Left vagus and cranial root of the left accessory.

E. Left hypoglossal.

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Summary of functions of all cranial nerves



SUGGESTED TEXTBOOKS



Snell, Clinical Anatomy, 7th edition, p. 614-618.

Thank You